

# Math 331 - Fall 2008 Project 3 - Fractals

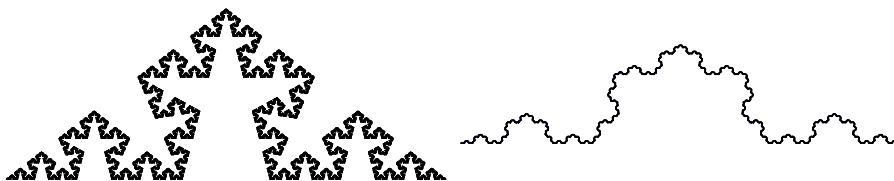
*Due Dec 17th*

For this project, you should submit a paper and a Maple file. The paper has two parts:

**First part of the paper:** Define a IFS of your choice and compute its similarity dimension (You have to create the parameters of the affine transformations). Describe clearly how you construct such a set and compute the similarity dimension. Plot the first 4 approximating sets to the IFS. Determine whether the limit of the approximating sets self-similar and/or a fractal.

**Second part of the paper** Choose one of the following two problems.

1. For each of the two sets in the figure below.
  - (a) Find the IFS parameters.
  - (b) Plot the first 4 approximating sets.
  - (c) Compute the similarity dimension of each of the set.
  - (d) What does the similarity dimension tells you about each set?
2. Make a procedure to approximate the von Koch curve, then modify it adding one parameter so that the curve becomes "spikier" or "flatter" (as in the figure below). Compute the similarity dimension for each value of the parameter. Study how the similarity dimension varies with the parameter and explain this variation.



Make sure you include the figures you produce in Maple in your paper. You will be graded on both the quality of your mathematical exposition and on the correctness of your computer work. A good paper should be complete and self-contained, discussing any necessary background material. Think that you are addressing a reader who might have never attended to our class, but took a few math courses in college. All the new

mathematical terms you introduce must be defined. All the answers must be justified. The writing must be entirely individual and that any form of sharing the paper or the Maple file will be penalized.

Note: In this project, the paper will have more weight than the Maple file in the computation of the grade.